STEAM-Powered Instruction: Practical Approaches for ELT Educators

STEAM (Science, Technology, Engineering, the Arts and Mathematics) education is fast becoming an essential approach to learning, helping students develop and use crucial 21st-century skills such as collaboration, creativity, and critical thinking.

In this webinar, we will:

- examine what STEAM instruction is and how to integrate it into the ELT classroom
- explore how integrating STEAM topics in ELT settings can teach students how to take calculated risks and how to learn through experiences ... all while using the target language and having a bit of fun!

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Eileen Finn

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Eileen is passionate about languages—she has taught English at major corporations, elementary schools, universities, community colleges, and private schools. She has led a variety of teacher education events, published internationally, presented her research at conferences, and had her art featured at festivals and galleries around the world.

Previously, Eileen was a U.S. Department of State Virtual English Language Fellow in India and Afghanistan.

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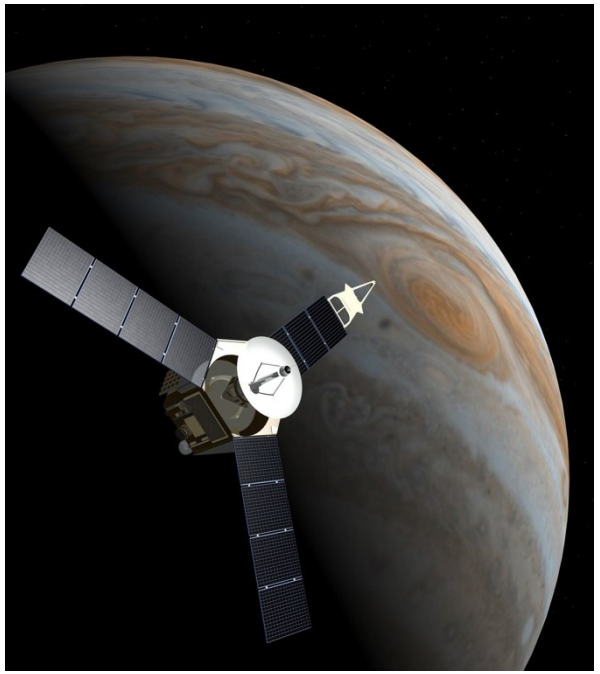
STEAM-Powered Instruction: Practical Approaches for ELT Educators

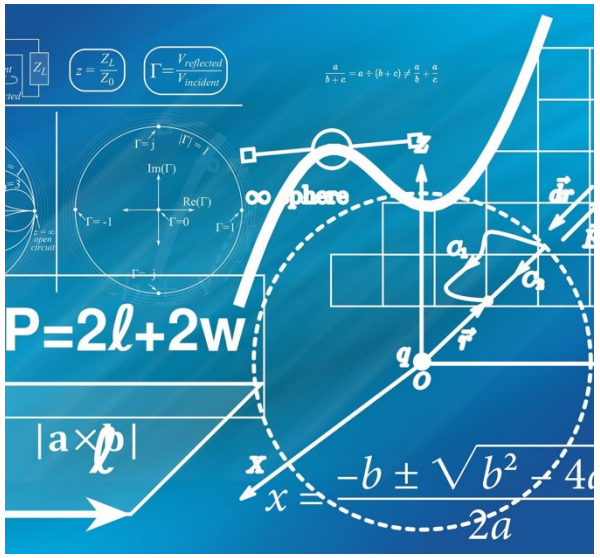
Session Plan

- Review STEAM education and its benefits
- Discuss tips to help develop activities that incorporate STEAM skills
- Explore 3 sample activities
- Talk about challenges of integrating STEAM

Definition of STEAM

"An approach to learning that uses Science, Technology, Arts and Mathematics as an access point for guiding student inquiry, communication, and critical thinking"





Which STEAM category could you add more of into your English language activities?

What are the goals of STEAM?

- Student-centered
- Gives target language and learning objective a purpose
- Increases motivation and engagement
- Opportunities for authentic language
- Develops leadership and managerial skills
- Integrates 21st century skills

Higher-Level Thinking

Remembering	Applying	Evaluating	Analyzing	Understanding	Creating
• find • outline • search • identify • match	• experiment • interview • paint • present • choose	• debate • test • comment • grade • predict	• explain • break down • categorize • integrate • deconstruct	• summarize • annotate • journal • gather • paraphrase	• blog • animate • write • film • solve

Video: STEAM and English

- While watching, think about:
  - what you see
  - what STEAM goals are being met

Video from JingJing International Education Group

What skills were being used?

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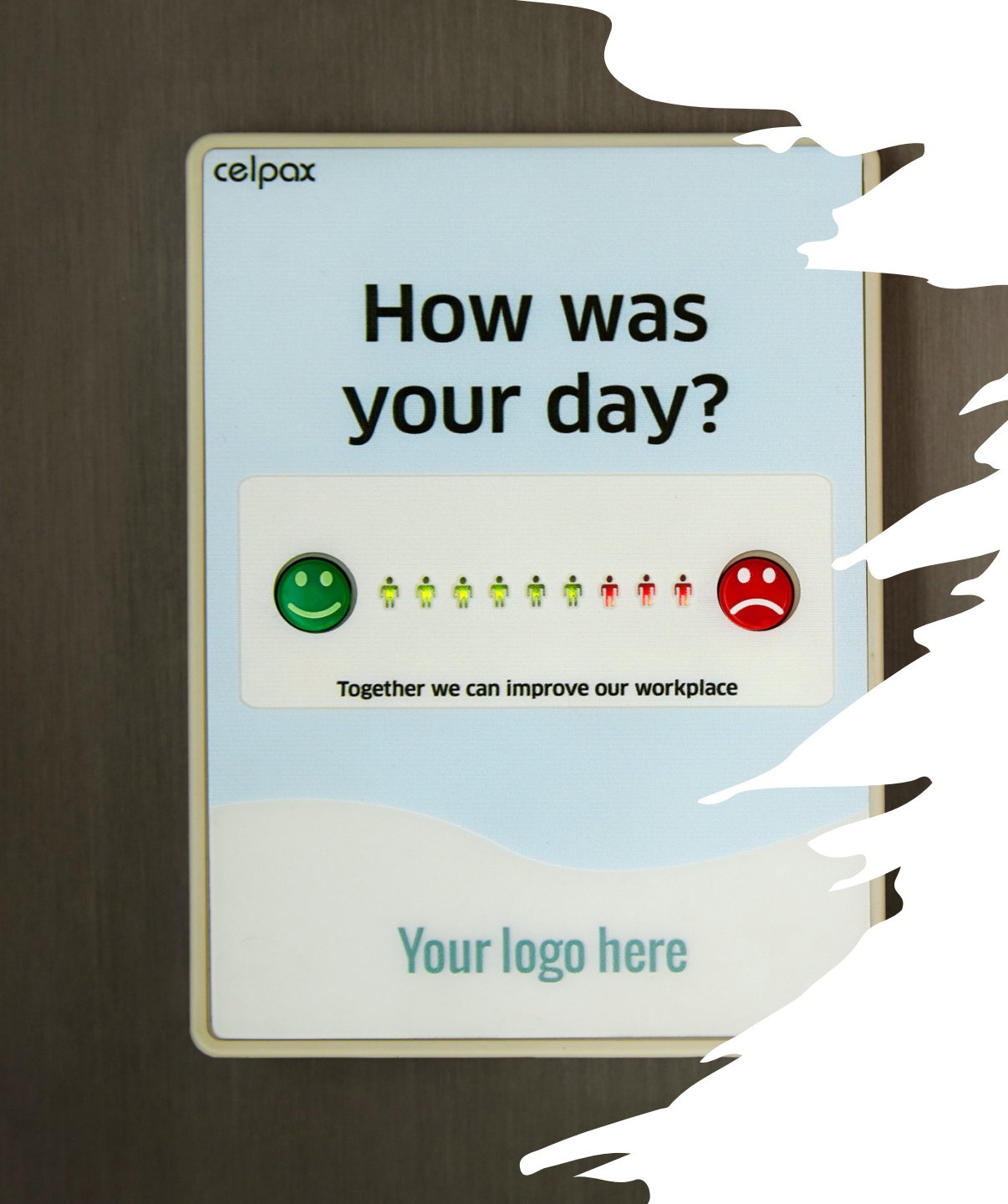
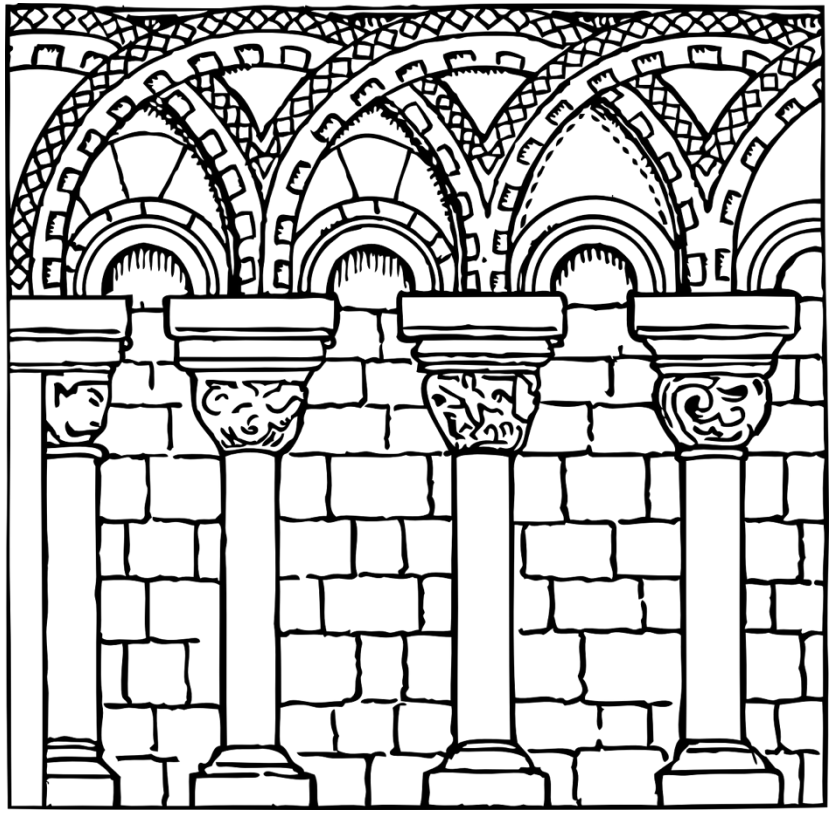


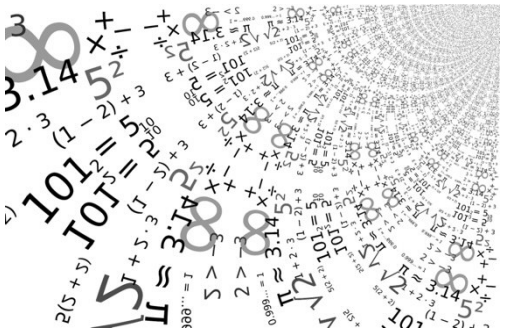
Tips for Developing Activities

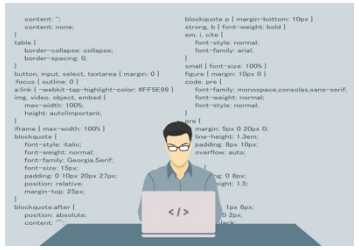
1. Interest-inventory
   - Which apps and technology do you most like to use?
   - How do you use them?
   - Which types of hands-on projects do you like to do? (art projects, construction, technology, etc.)
   - How do you share what you make with others?

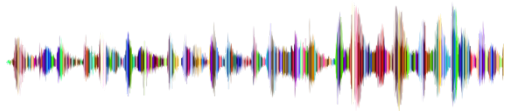
2. Collaborative Projects

- Students have a voice and choice
  - Can choose partner, products to produce, sub-topics or questions
- Keep it interesting
  - Introduce a design issue or problem
  - Have teams swap projects
- Learn through conversation
  - Student-to-student teaching
  - Lessens the teacher’s need to encourage student participation
- Increased scaffolding









3. Connect to STEAM Subjects

If you are teaching patterns in spelling, connect it to patterns in STEAM topics:

- odd and even numbers
- sound waves
- buildings
- coding
- dance choreographies
- abstract paintings

How do you, or how will you, use these tips to integrate more STEAM skills in your classes?

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- **Explore 3 sample activities**
- Talk about challenges of integrating STEAM

STEAM in literature

- Use QR codes as hints as to what story you will be reading next
- Read about a famous engineer, astronaut, scientist, etc.
- Create a project from the literature
  - If you read a children's book about a caterpillar…
    - build a caterpillar or butterfly from recycled materials
    - create a poster
    - draw the life cycle of a butterfly
    - read about monarch butterflies' journey from the United States to Mexico

Activity 1

QR Code Gallery Walk activity

- Materials:
  - Internet
  - 5 – 6 photos in .jpg or .png format
  - Paper
  - Printer
  - Gallery Walk worksheet
  - Students will need cellphones

Activity 1

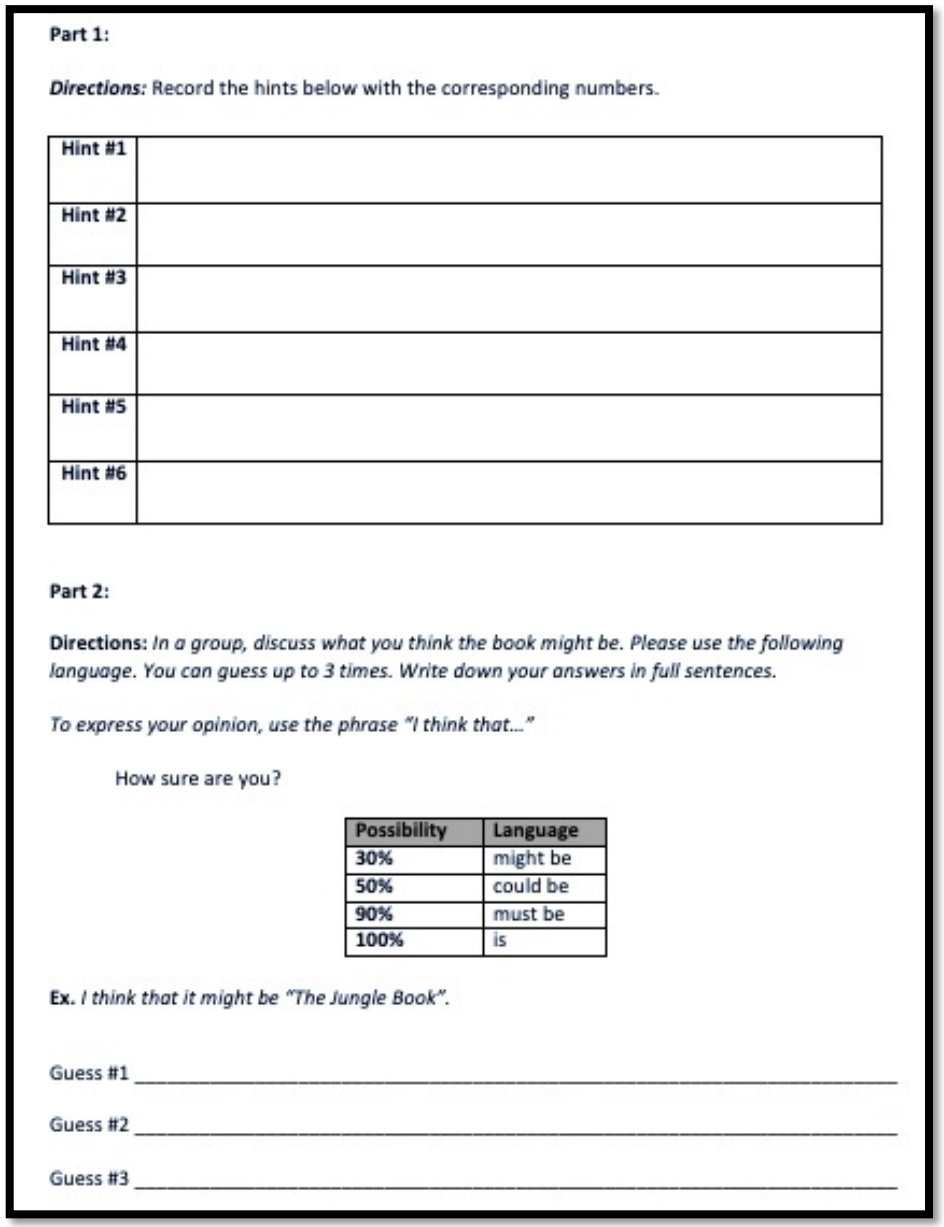
- Teacher Preparation:
  - Pick an article, text, or book
  - Think of 5 to 6 hints
  - Download 5 to 6 images of the hints
    - www.pixabay.com
    - www.unsplash.com
  - Upload the photos to www.me-qr.com
  - Download the QR codes
  - Print them and hang on walls

Activity 1

- Teacher will ask…
  - What's your favorite book?
  - What do you think we'll read next?
- Teacher will model using QR codes—give the first hint

Activity 1

- Give language support
  - Modals of possibility:
    - Might be, could be, must be
  - Sentence Starter:
    - I think that…
  - Graphic organizer



Part 1:

Directions: Record the hints below with the corresponding numbers.

Hint #1	
Hint #2	
Hint #3	
Hint #4	
Hint #5	
Hint #6	

Part 2:

Directions: *In a group, discuss what you think the book might be. Please use the following language. You can guess up to 3 times. Write down your answers in full sentences.*

To express your opinion, use the phrase "I think that…"

How sure are you?

Possibility	Language
30%	might be
50%	could be
90%	must be
100%	is

Ex. *I think that it might be "The Jungle Book".*

Guess #1 _____

Guess #2 _____

Guess #3 _____

Activity 1

- This activity…
  - was student-centered
  - gave target language and learning objective a purpose
  - increased motivation and engagement
  - gave opportunities for authentic language
  - developed leadership and managerial skills
- Uses higher-level learning
- Uses 21st – century skills

Activity 1

- Adaption for online:
  - You can post the QR codes online
    - Google Drive
    - www.padlet.com
- Extension Activity:
  - Students can create their own QR code activity for:
    - favorite books
    - book report
    - characters

What sort of scaffolding might you need to provide for this activity?

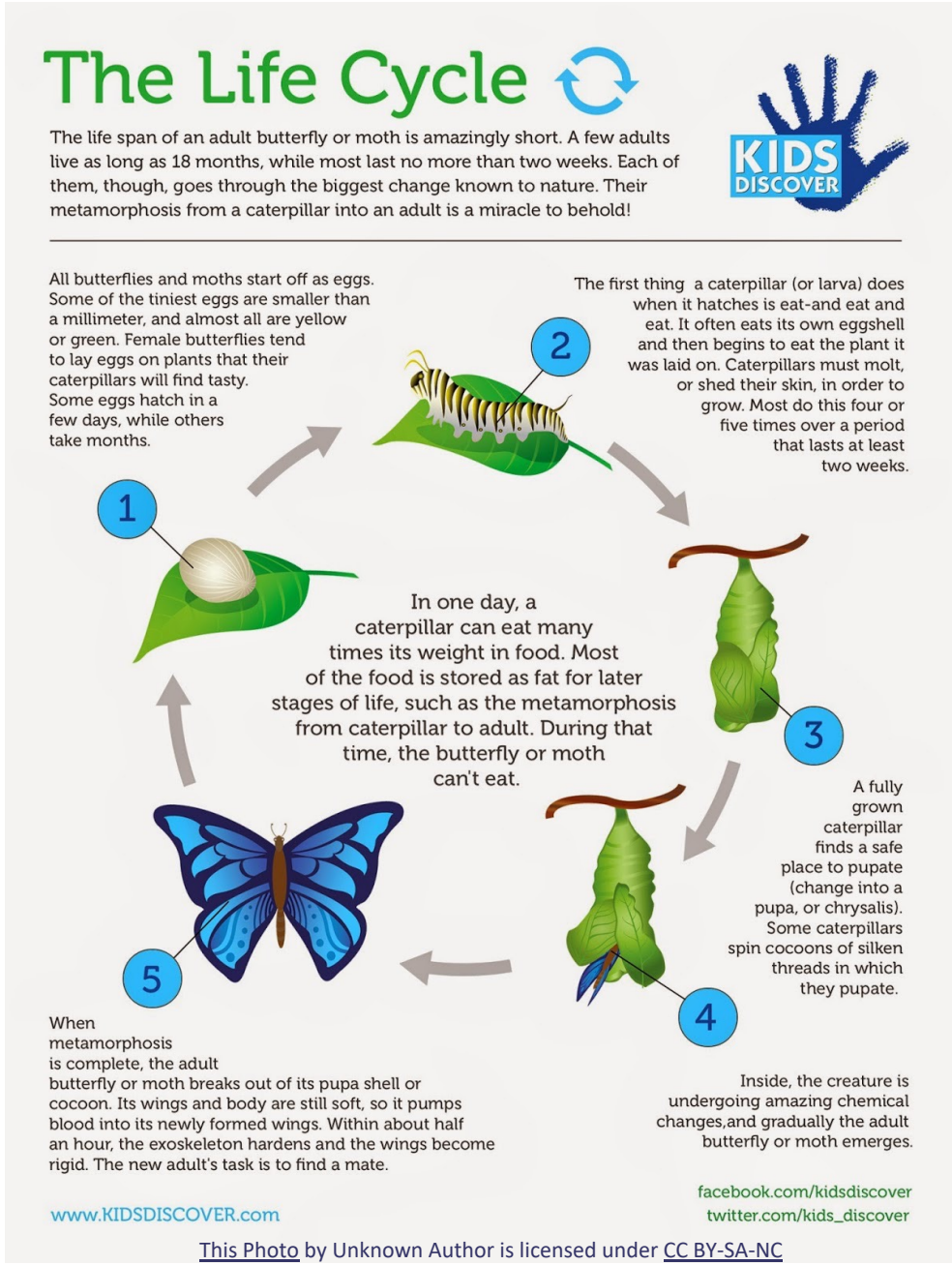
Activity 2

Life cycle of the butterfly

- Material:
  - A book or article about a caterpillar
  - Internet
  - Computers or phone
  - A graphic design or template tool of your choice, like www.canva.com
  - Article on life cycle of butterfly

Activity 2

- Teacher preparation:
  - Choose an article about the life cycle of the butterfly
  - Print out worksheets and graphic organizers or have links ready to go
  - Make sure students have access to computers, tablets, or phones
  - Make a model of the poster that you want to show



Activity 2

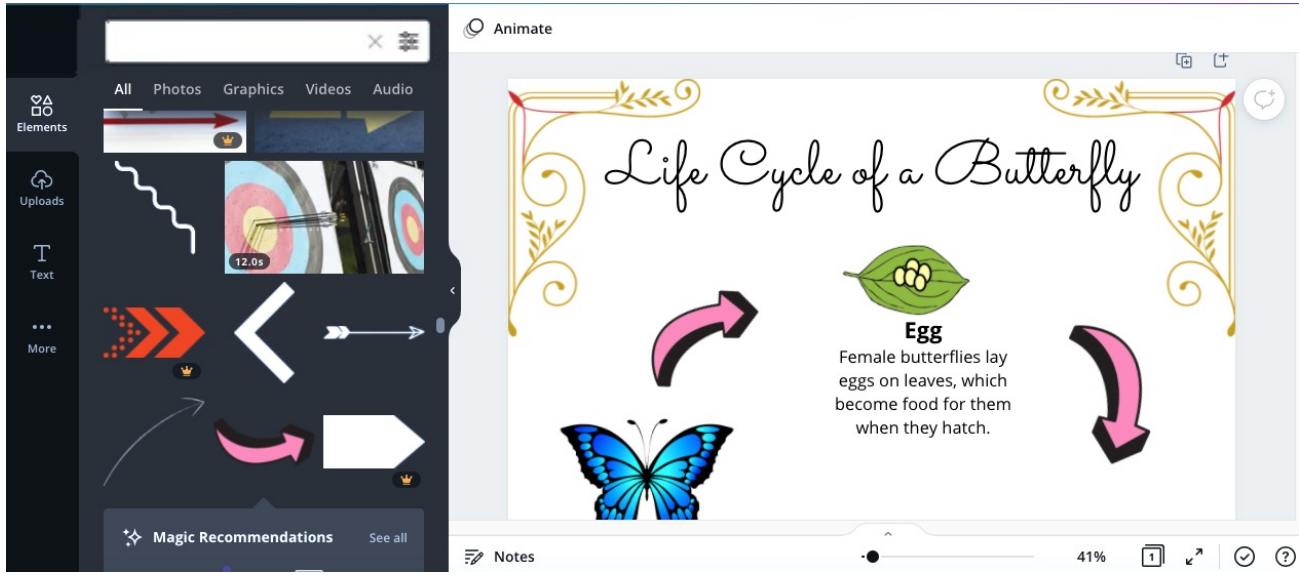
- Teacher will ask…
  - What does the caterpillar eat?
  - The caterpillar changed several times. What did it change into?
- Model the poster for them
- Let students know they'll be making a poster of the life cycle of a butterfly
  - They need to label each stage and write about it
  - Have illustrations that go along with it

Activity 2

- Give language support
  - Transitions words for sequence of events
    - First, next, then, finally
  - Graphic organizer
  - Sentence starter:
    - The first stage is…
    - The next stage is…

Caterpillar Book		
Beginning	Middle	End
		

Activity 2



- Give instructions:
  - Students will work with a partner and fill out the graphic organizer
  - When finished, put them into groups of 4
  - Then students will use a graphic design tool to make a poster on the life cycle of the butterfly
    - Assign roles
  - When finished, students will present

How might you adapt this activity for a large class?

Activity 2

- This activity…
  - was student-centered
  - gave target language and learning objective a purpose
  - increased motivation and engagement
  - gave opportunities for authentic language
  - covered science, art, and technology
- Uses higher-level learning
- Uses 21st – century skills

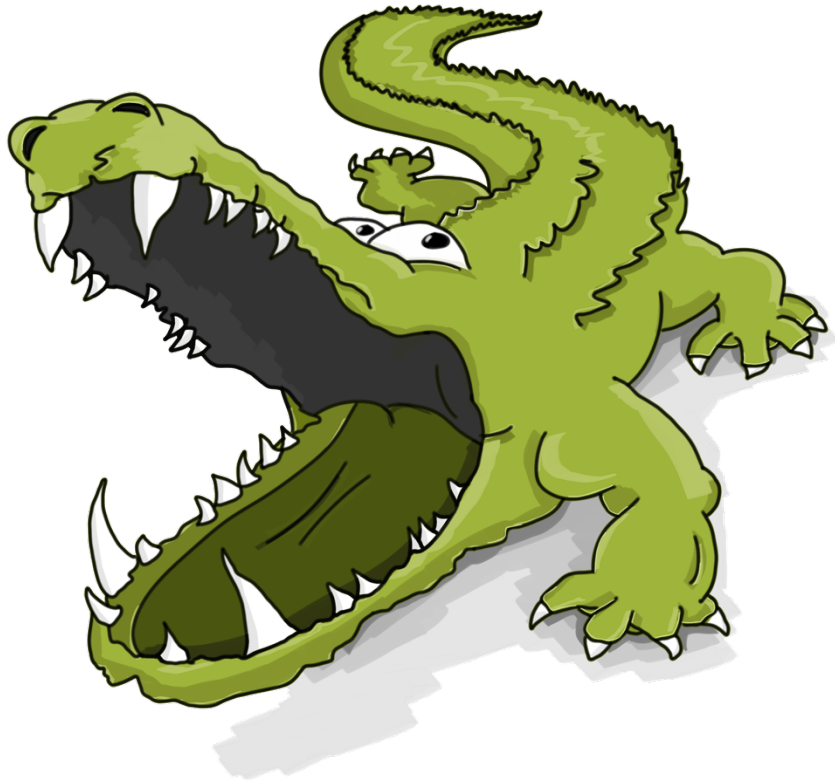
Activity 2

- Adaption for offline:
  - Create a poster using paper
  - Use a worksheet instead
- Extension activity
  - Create a butterfly or caterpillar out of recycled materials
  - Focus on heath by discussing what the caterpillar eats on what days

Activity 3

Crocodile versus Alligator

- Material:
  - Article
  - Venn diagram print out
  - Internet
  - Computers or cellphones



Activity 3

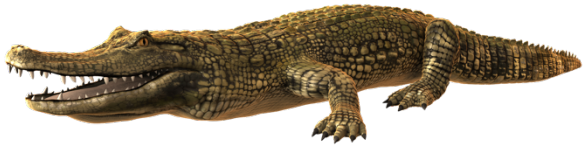
- Teacher preparation:
  - Choose an article about crocodiles versus alligators
  - Print out worksheets and graphic organizers
  - Make a model of activity
- Teacher will ask…
  - What’s the difference between a crocodile and an alligator?
- Model the Venn diagram and Kahoot quiz
- Let students know they’ll be making a quiz

Language Goals: Relational phrases (e.g. compare, contrast, differences, similarities etc.)

1. Focus on sentence frames that apply to higher-level learning

"They are different because a _____ has _____, and a _____ has _____

2. Have students notice grammar clusters



"Crocodiles are bigger, have v-shaped snouts and are more aggressive. They also have visible bottom teeth and are light green, brown or light grey."

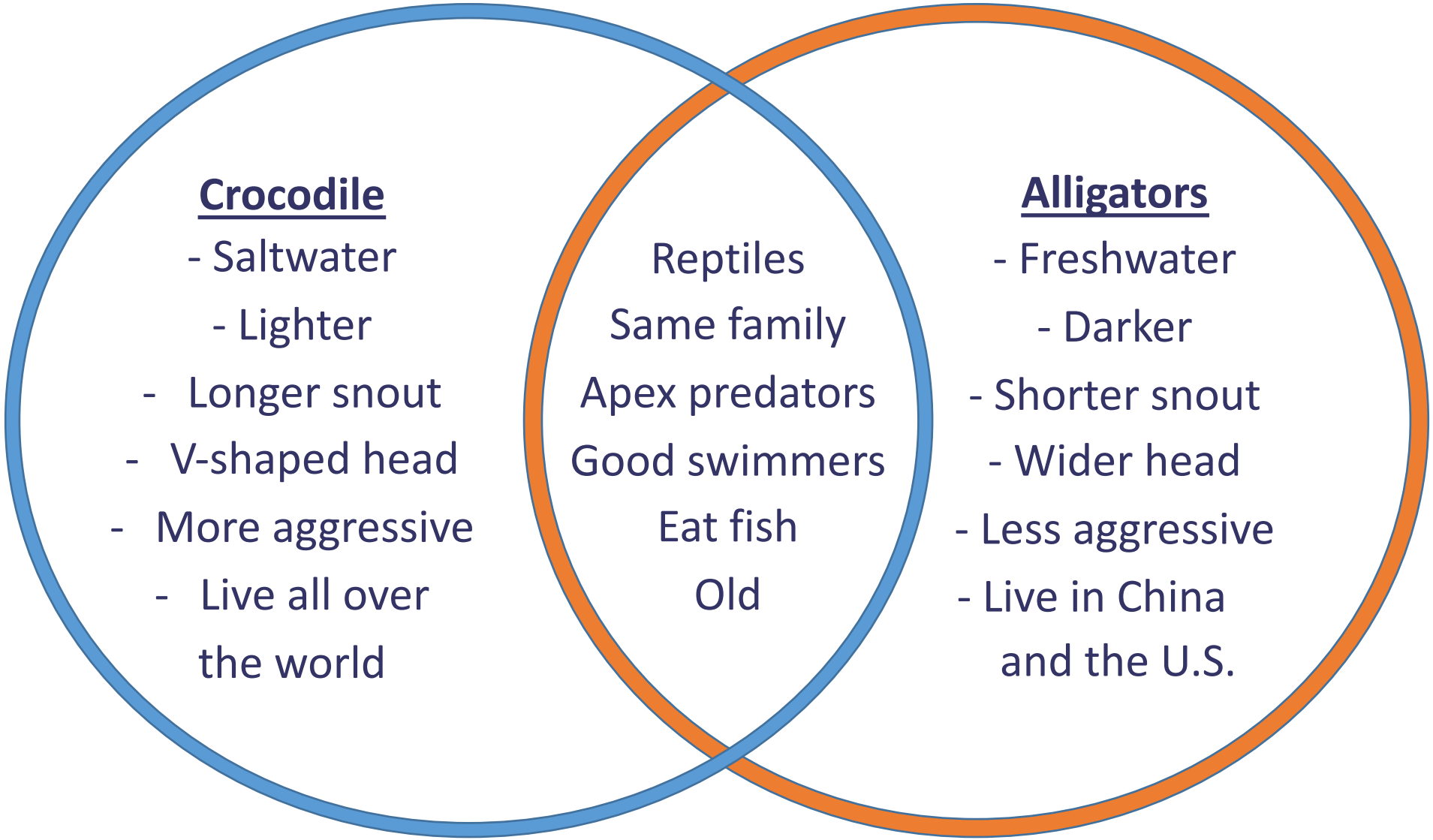
"Crocodiles are bigger, have v-shaped snouts and are more aggressive. They also have visible bottom teeth and are light green, brown or light grey."

"Crocodiles are bigger, have v-shaped snouts and are more aggressive. They also have visible bottom teeth and are light green, brown or light grey."

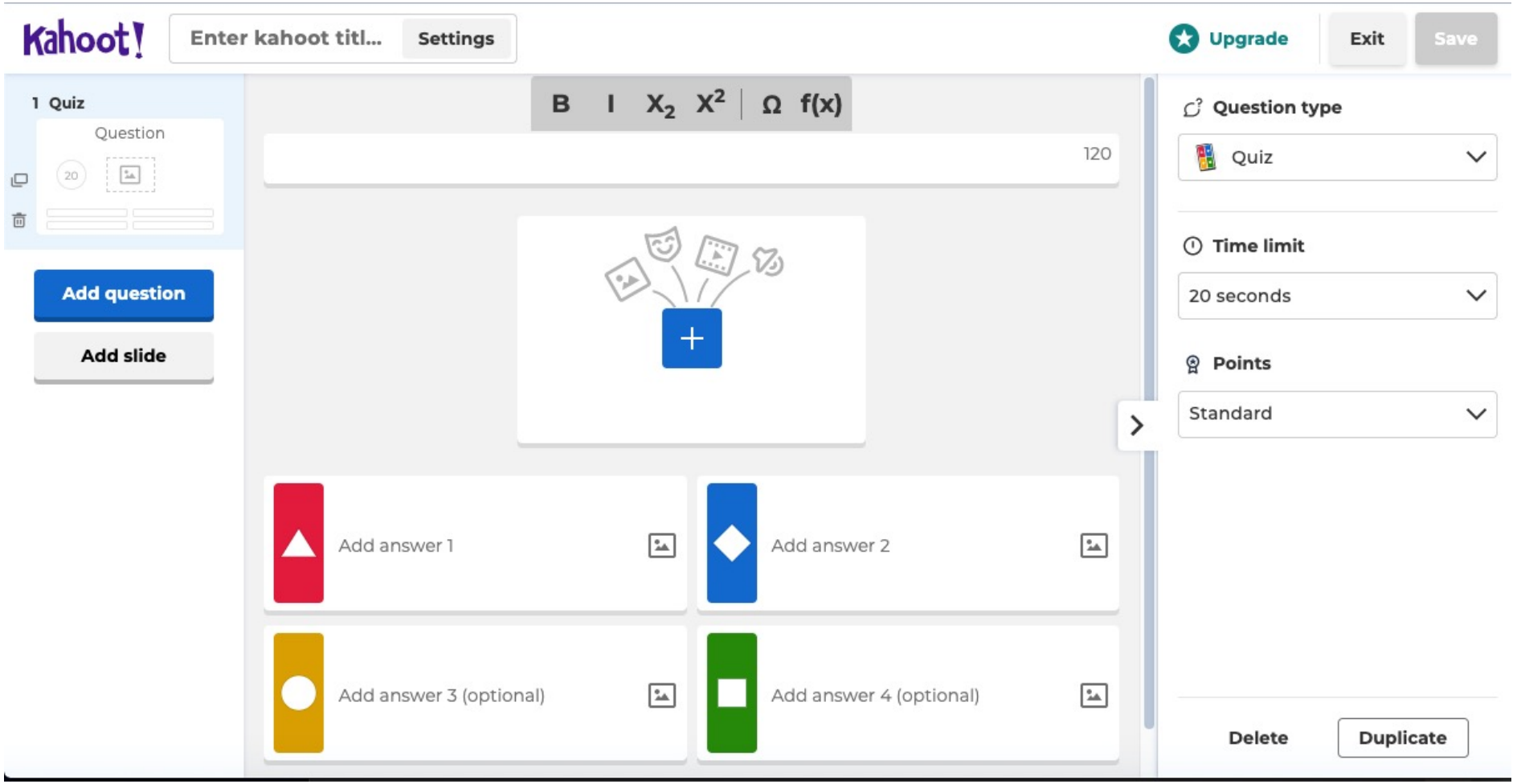
Activity 3

- Give Instructions:
  - Students will read the article on crocodiles versus alligators
  - Divide into groups
  - Use a Venn diagram to show differences
  - Create an online quiz using kahoot.it or a similar platform
  - Will give Kahoot code to another group to play
  - Will receive feedback from another group

Activity 3 – Venn Diagram



Activity 3


Kahoot!
Enter kahoot titl...
Settings
Upgrade
Exit
Save
1 Quiz
Question
20
Add question
Add slide
B I X2 X2 Ω f(x)
120
Add answer 1
Add answer 2
Add answer 3 (optional)
Add answer 4 (optional)
Question type
Quiz
Time limit
20 seconds
Points
Standard
Delete
Duplicate

Which has a longer, more V-shaped head, a crocodile or an alligator?

Skip

3

0
Answers

▲ Crocodile

◆ Alligator

Quiz

Correct

Answer Streak 1

+ 501

You're on the podium!

Which are darker, crocodiles or alligators?

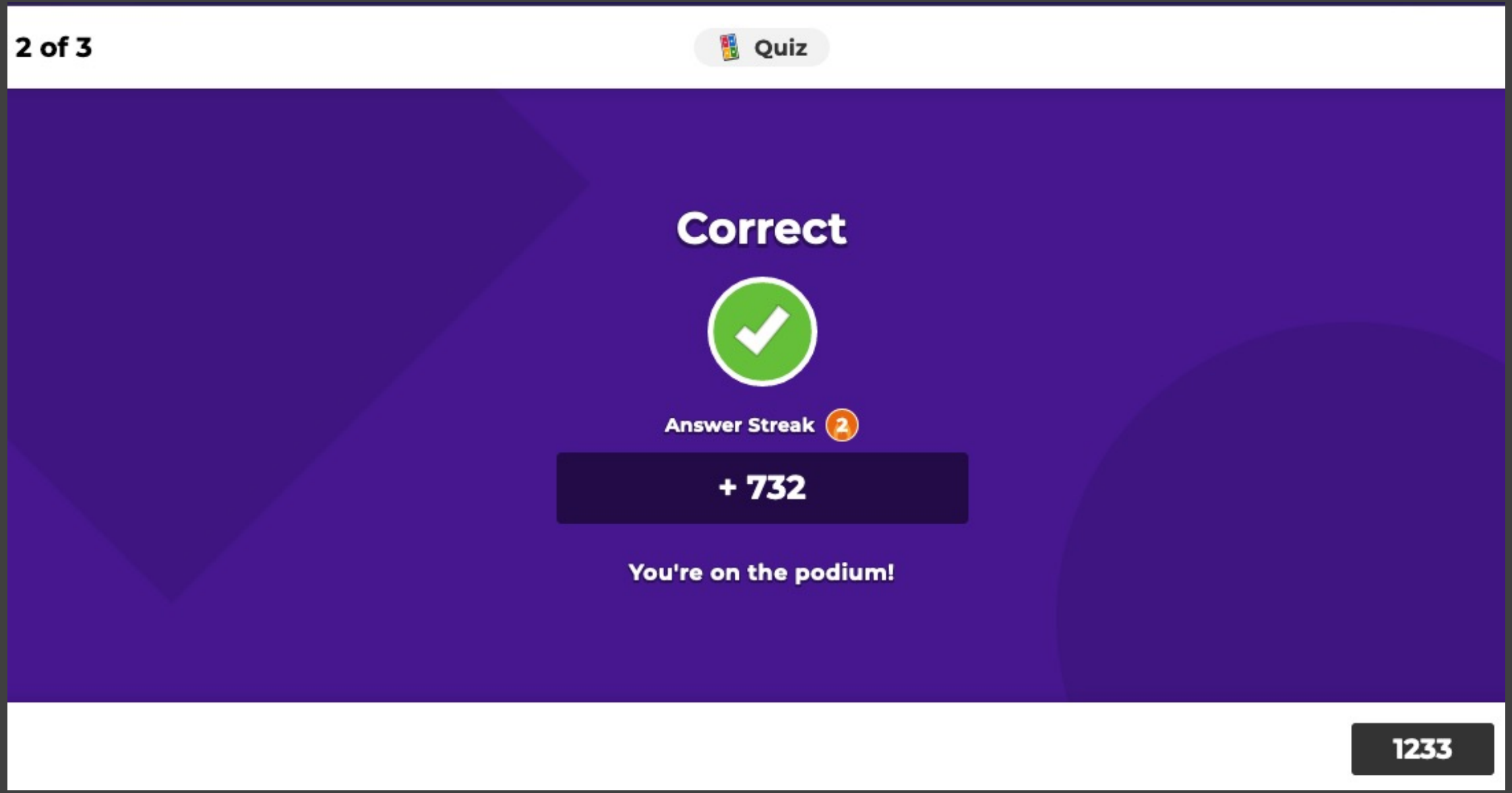
Skip

17

0
Answers

▲ Crocodile

◆ Alligator

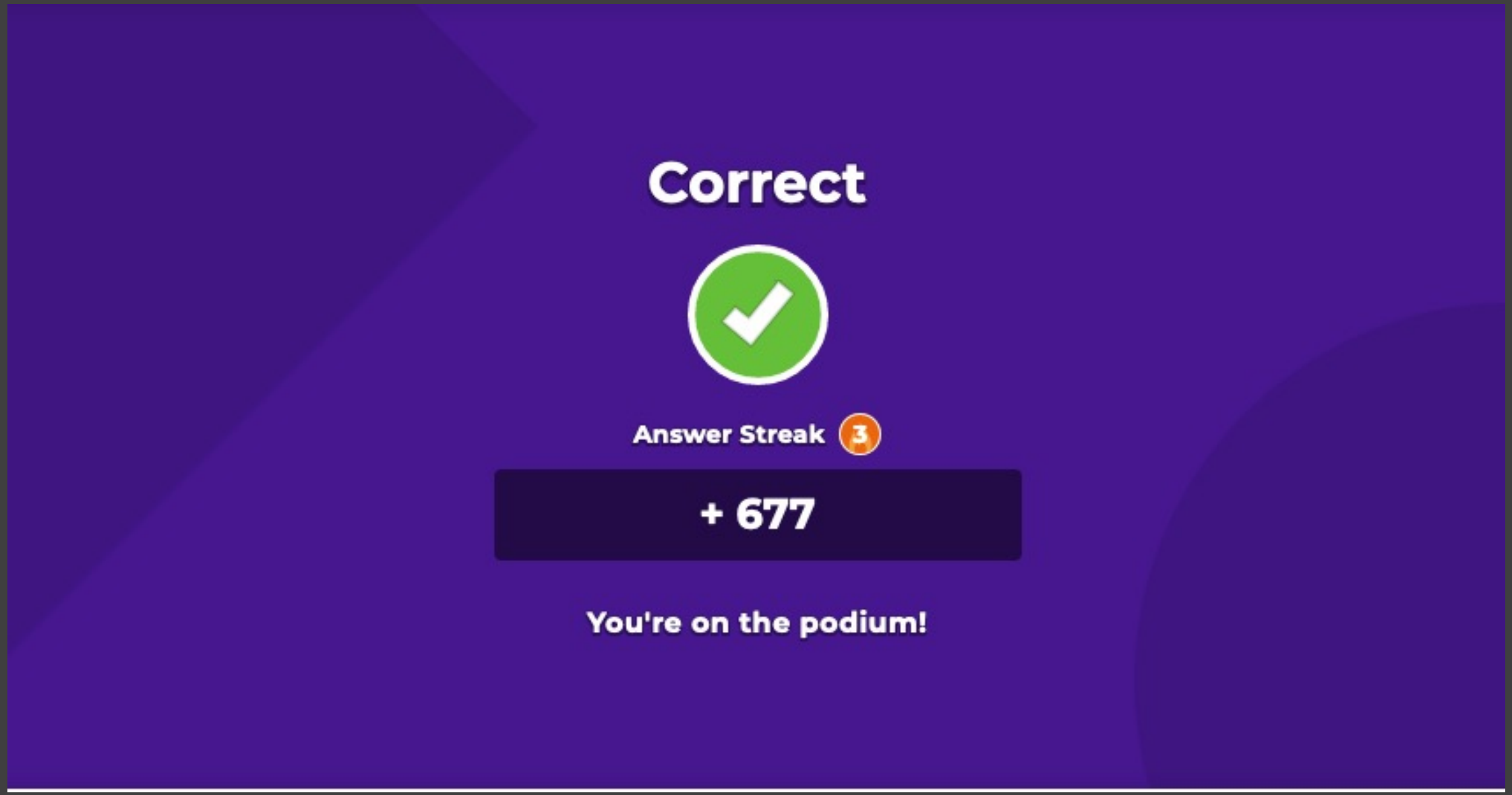

2 of 3
Quiz
Correct
Answer Streak 2
+ 732
You're on the podium!
1233

Which are more aggressive, crocodiles or alligators?

13

▲ Crocodile

◆ Alligator


Correct
Answer Streak 3
+ 677
You're on the podium!

1st place

Highest score!

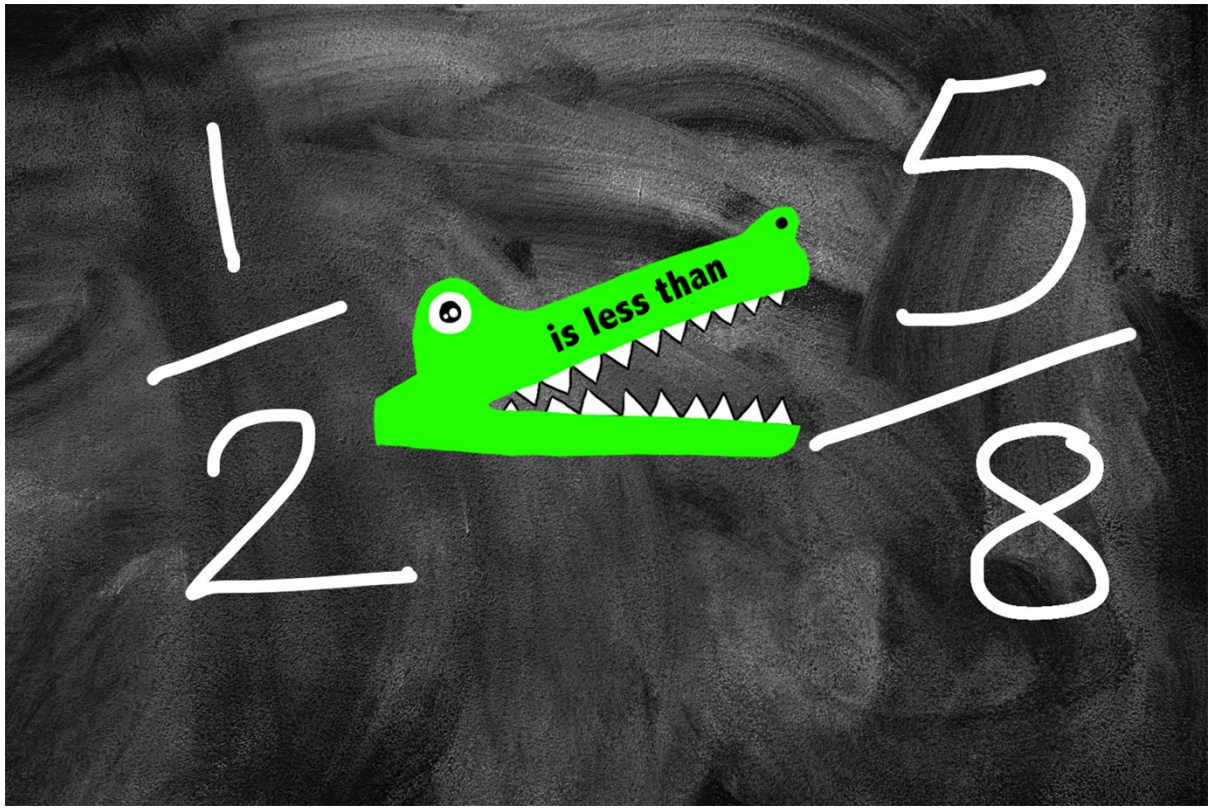
What other language topics might you incorporate in this type of activity?

Activity 3

- This activity…
  - was student-centered
  - gave target language and learning objective a purpose
  - increased motivation and engagement
  - gave opportunities for authentic language
  - covered science, art, math, and technology
- Uses higher-level learning
- Uses 21st – century skills

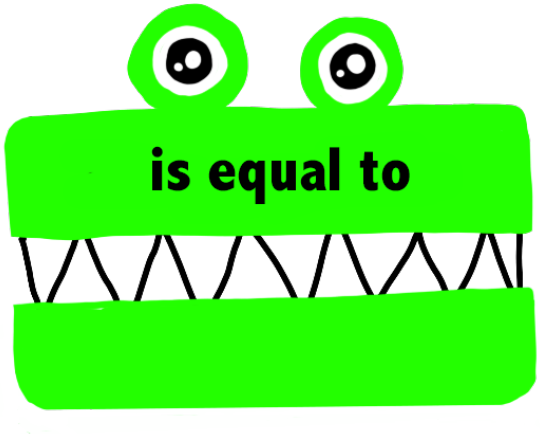
Activity 3

- Adaption
  - Create a quiz on Quizlet
  - Write quiz on paper
- Extension
  - Math activity
    - Flashcards
    - Worksheets
    - Scissors
    - Pen or pencil



Activity 3 – Extension Activity

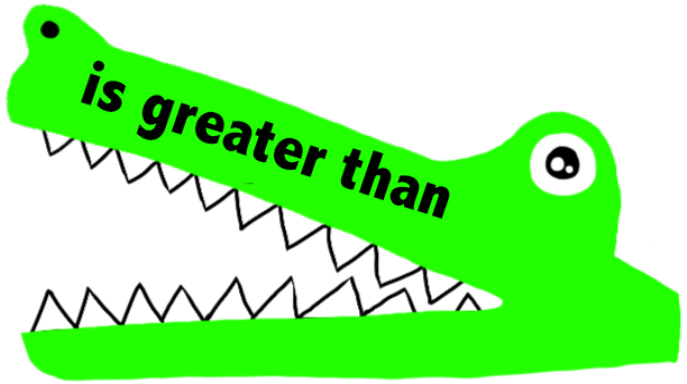
0.5



1/2

Activity 3 – Extension Activity

0.8



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Activity 3 – Extension Activity

0.2

1/4

Session Plan

- Review STEAM education and its benefits
- Discuss tips to help develop activities that incorporate STEAM skills
- Explore 3 sample activities
- **Talk about challenges of integrating STEAM**

What challenges have you experienced integrating STEAM skills in your English classes?

Understand the challenges of integrating STEAM

- Curriculum change is difficult
- Time
- Not everyone is an expert
- Coordinating
- Training
- Country dependent
- Test based
- Buy-in and collaboration

Resources

A. Online Resources:

1. www.nasa.gov/stem
2. https://whyy.pbslearningmedia.org/collection/wv-steam-lesson-plans/
3. https://learn.concord.org/
4. https://blog.ck12info.org/top-10-stem-resources/

B. Materials:

1. ask parents for donations
2. bring materials from home
3. use recycled material

Summary

- STEAM education and its benefits
- Discussed tips for developing activities that incorporate STEAM skills
- Explored 3 sample activities
- Talked about challenges of integrating STEAM

What’s one activity or topic you will use in your classroom?

References

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Reflection Questions

1. How do you support 21st-century skills development in your English language classes? Have you ever added STEAM elements to activities and lessons to help achieve that goal?

2. How might you plan to add STEAM components into your lesson plans? Are there systematic steps you might take when developing lesson and unit plans?

3. How might your students react to an increased amount of STEAM elements in your curriculum? Why? How can you prepare to support them? How could you learn about which STEAM topics might interest them the most?

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